

## CLAIMS

What is claimed is:

1. A system for optical scanning along one line with  
5 fast random access and high optical resolution, comprising:  
a plurality of first lenslets constructed for use with a  
selected media format, said plurality of lenslets all being  
disposed in a single row and being spaced apart by a given  
center-to-center distance;  
10 a movable mount carrying said plurality of lenslets;  
a linear motion actuator coupled to said mount for moving  
said mount only in a direction substantially parallel to said  
single row over a distance having a maximum value that is  
substantially equal to or slightly greater than the given  
15 center-to-center distance;  
at least one light source;  
a light directing unit for directing light from said  
source to any one or two selected lenslets; and  
a control unit for controlling said light directing unit.  
20
2. The system of claim 1, wherein said single row of  
lenslets is arranged in at least approximately a straight  
line.

3. The system of claim 1, wherein each of said lenslets has a diameter not greater than about 20 mm.

4. The system of claim 1, wherein each of said lenslets  
5 comprises at least one of: a refractive surface; a reflective surface; a diffractive surface; a diffractive medium; and a gradient index optical material.

5. The system of claim 1, wherein said at least one  
10 light source comprises at least one laser.

6. The system of claim 5, wherein said at least one light source further comprises beam shaping optical elements.

15 7. The system of claim 6, wherein said light directing unit is a beam steering unit, a light deflector, or a scanner.

8. The system of claim 7, wherein said light directing unit comprises at least one of: a mechanical element; an  
20 electro-optical element; and an acousto-optical element.

9. The system of claim 1, wherein said system is operative to read and/or write data on rotating optical disk media containing data stored in the selected media format.

10. The system of claim 1, wherein said light directing unit comprises optical fibers coupling said light source to said lenslets.

5 11. The system of claim 1, wherein said light directing unit comprises an angular scanner that varies the angle at which light from said source is directed to said plurality of lenslets.

10 12. The system of claim 11, further comprising:  
a first optical unit disposed between said light source and said light directing unit and containing at least one first optical element; and

15 a second optical unit disposed between said light directing unit and said plurality of lenslets and containing at least one second optical element.

13. The system of claim 12, wherein:

20 said plurality of lenslets have entrance pupils that are located in a common plane and said first and second optical units form a combined optical subsystem;

25 said combined optical subsystem has an entrance pupil that is in proximity to said light source and is imaged by said combined optical subsystem onto the plane of the entrance pupils of the plurality of lenslets in the lenslet array such that when light from said source is moved by said light directing unit, the entrance pupil of said combined optical subsystem can be located at, or very near, the entrance pupil of a selected lenslet;

30 said second optical unit has a focal plane that is at, or near, said light directing unit such that the direction at

which light exits from said second optical unit towards the selected lenslet is substantially independent of which lenslet is selected and/or the state of said light directing unit.

5        14. The system of claim 12, further comprising a unit for supplying light that is focused to a spot to said first optical unit so that the focused spot of light is imaged by said first and second optical units at or near a surface of a media to be scanned and can be moved both above or below the  
10 media surface, and parallel to the optical axes of said lenslets without moving said lenslets or said light directing unit.

15        15. The system of claim 14, where said unit for supplying light that is focused to a spot comprises means for reading signals returned from the media surface and tracking and focus errors.

20        16. The system of claim 1, further comprising a second row of a plurality of second lenslets that are different from said first lenslets, carried by said movable mount, for use with a second media format different from said selected media format, and wherein said light directing unit comprises means for selectively directing light to one of said rows of  
25 lenslets.

17. The system of claim 16, wherein said at least one light source comprises a plurality of light sources each arranged to deliver light to a respective one of said rows of lenslets.

18. The system of claim 17, wherein each of said light sources produces light having a respectively different wavelength.

19. The system of claim 1, further comprising:  
a row of elements for emitting or reflecting light carried by said movable mount; and

a position detector for detecting the position of said light emitters or reflectors to provide an electrical signal for controlling synchronization of movement of said movable mount and said light directing unit to cause light to be directed by said light directing unit at least approximately at the center of the entrance pupil of a selected lenslet.

20. The system of claim 19, wherein said row of elements are light reflecting elements and said system further comprises a second light source for illuminating said light reflecting elements.

21. The system of claim 20, further comprising a beam splitting optical element cooperating with said second light source.

5

22. The system of claim 1 for scanning a surface of a disc constituting a media containing data arranged in a plurality of tracks, wherein:

said at least one light source produces at least two  
10 laser beams for simultaneously illuminating at least two spots on the disc surface, each spot being illuminated by a respective beam; and

said system further comprises a plurality of signal detectors for facilitating readout of light reflected from  
15 each spot separately at the same time, thereby allowing simultaneous readout of several tracks of the media at the same time.

23. The system of claim 22, wherein said at least one  
20 light source comprises a plurality of lasers, or a single laser and an optical element to create multiple beams.

24. The system of claim 22, wherein said at least one light source comprises a single laser and an optical element

to create multiple beams and said optical element comprises at least one of a diffraction grating and a polarization based prism.

5        25. A method for positioning a light spot on a surface of a moving optical disc containing optically readable data arrange in a plurality of tracks during a random access operation, said method comprising:

analyzing previous tracking error signals;

10        predicting, on the basis of said analysis, track movements due to disk eccentricity and mechanical imprecision; and

based on the result of said predicting step, positioning the light spot during the random access operation very close a  
15        target track, thereby minimizing the time needed to access the target track.